

**Solution.**

## EE212 Principles of Macroeconomics, 2/2015 (Sec. 046401)

### Problem Sets 3 :

### Chapter 6. ISLM Model

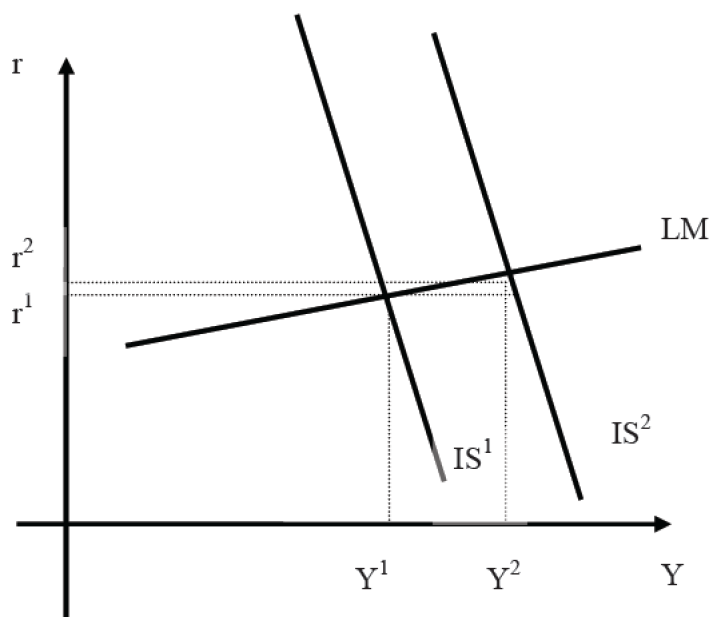
1. Consider an economy where the money demand is not sensitive to income while investments are not very sensitive to the interest rate.
  - (a) Using diagrams to illustrate your answer discuss the effectiveness of fiscal and monetary policy in such a case using the IS-LM model.
  - (b) Suppose you're an economic advisor to this economy which was facing a deflationary gap. Please explain whether you'll suggest the use fiscal or monetary policy to eliminate the deflationary gap.

**Solution.**

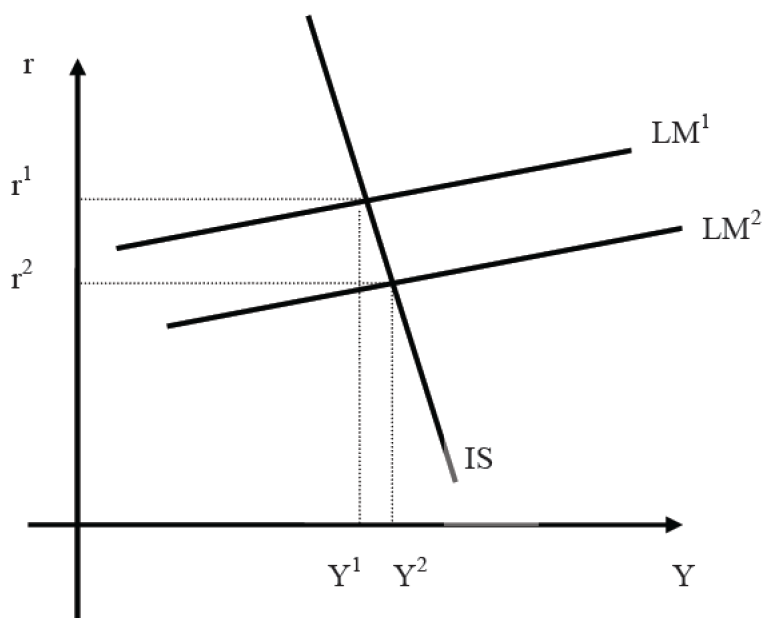
- (a) "This is the Keynesian case, where the IS is quite steep (investments are not very sensitive to the interest rate) while the LM curve is quite flat (money demand is not sensitive to income). In this particular case we have the following results:
  - i. Fiscal policy is really powerful in affecting the equilibrium level of output;
  - ii. Monetary policy is not particularly effective"
- (b) "Fiscal policy: an increase in government expenditure (or a decrease in taxes) shifts the IS curve from IS1 to IS2. This results in an increase in equilibrium output from Y1 to Y2, and also in the equilibrium interest rate. However, in this case the increase in the equilibrium interest rate is very small and so it is the crowding out. Fiscal policy is very effective."

Why? An increase in  $G$  increases  $Y$  through the multiplier effect. An increase in  $Y$  in the goods market increases money demand in the money market. Now, for a given money supply, there is an excess of money demand in the money market. According to the theory of liquidity preference, the interest rate in the money market should increase because of the adjustment in people's portfolio. Given that the interest rate has increased by little and given the fact that investments are not very sensitive to it, the crowding out effect is very small (investment decreases by a small amount);

graphically, "



“Monetary policy: here we have the opposite result. Suppose an increase in money supply. The LM shifts from  $LM^1$  to  $LM^2$ .”



“Equilibrium output increases while the equilibrium interest rate decreases. However, the increase in output is very limited. Why? An increase in money supply, given the money demand, creates an excess of money supply in the money market. According to the theory of liquidity preference, the interest rate must decrease to restore the equilibrium. The decrease in the interest rate increases investments in the goods market and so equilibrium output increases. However, since investments are not very sensitive to the interest rate, the increase in investment is quite limited and so it is the increase in  $Y$ .”

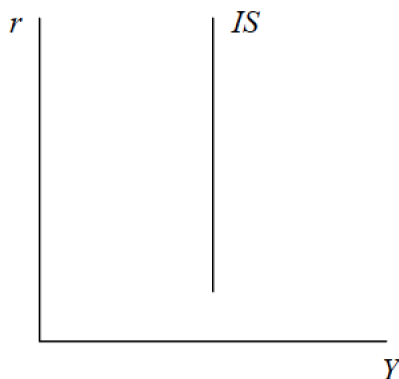
2. We normally draw the IS curve as downward sloping and the LM curve as upward sloping, as appropriate for our usual assumptions about behavior. How would either or both of these curves look different if the following unusual assumptions were made? Either describe or draw your answers, being sure in either case to make clear what you mean.

- (a) Investment does not depend on the interest rate.
- (b) The MPC is zero.
- (c) Demand for money does not depend on income.

**Solution**

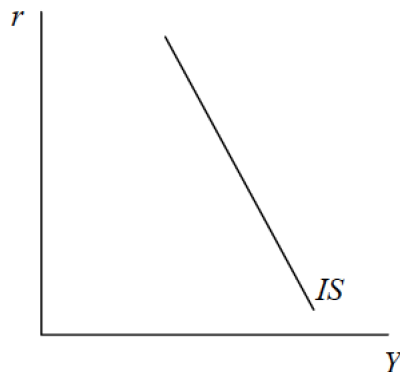
- (a) Investment does not depend on the interest rate.

- IS curve is vertical (because now, as the interest rate falls, there is no component of aggregate demand that increases).

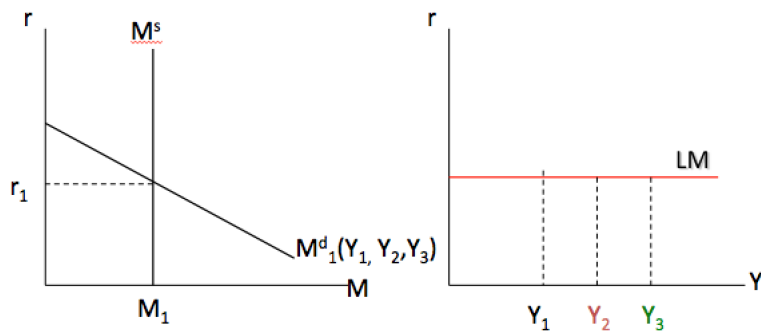


- (b) MPC is zero

- This makes the IS curve steeper than it would otherwise be, but it does not cause it to be vertical. It makes the multiplier equal to 1, rather than larger than one, but this is enough for a fall in the interest rate that increases investment to still cause an increase in income.



- (c) Demand for money does not depend on income.



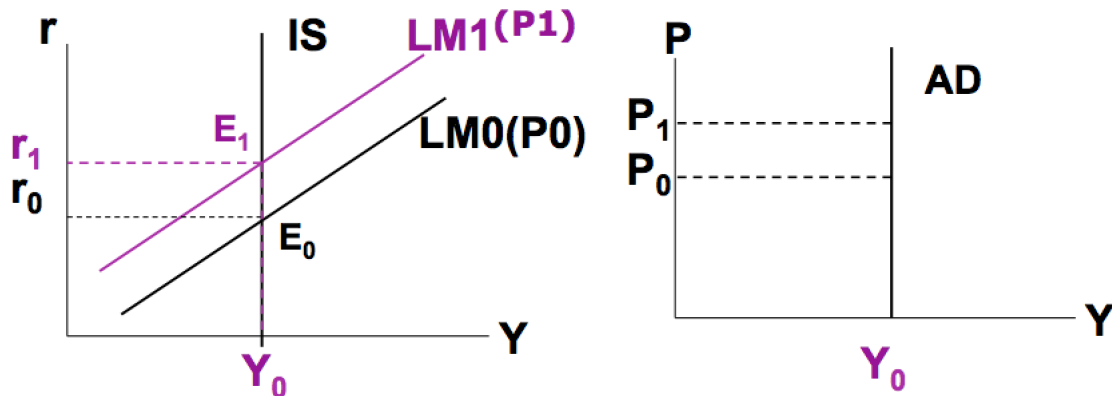
- The LM curve is horizontal (because now demand will equal supply of money only at the particular level of the interest rate,  $r$ , for which that is true for all  $Y$ ).

3. In each case of Question 2 (listed below), draw aggregate demand curve (AD).

- Investment does not depend on the interest rate.
- The MPC is zero.
- Demand for money does not depend on income

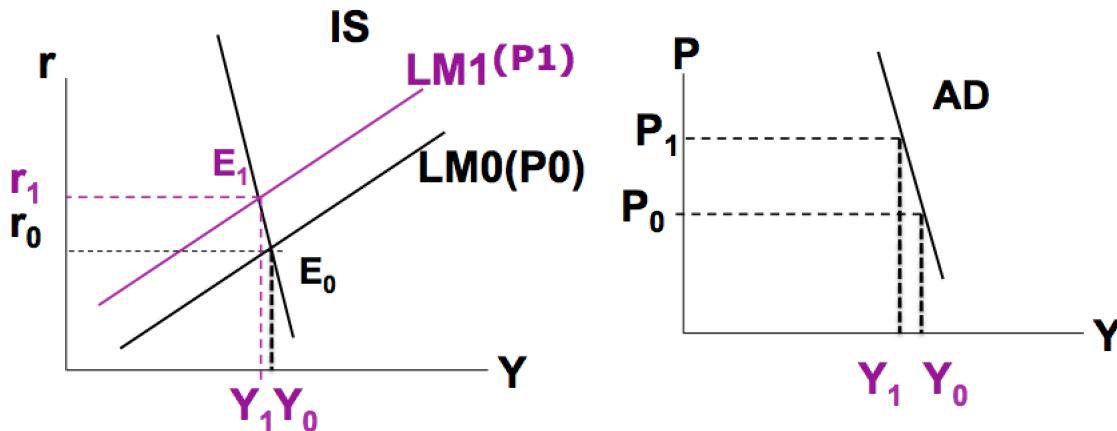
**Solution.**

- Investment does not depend on the interest rate.

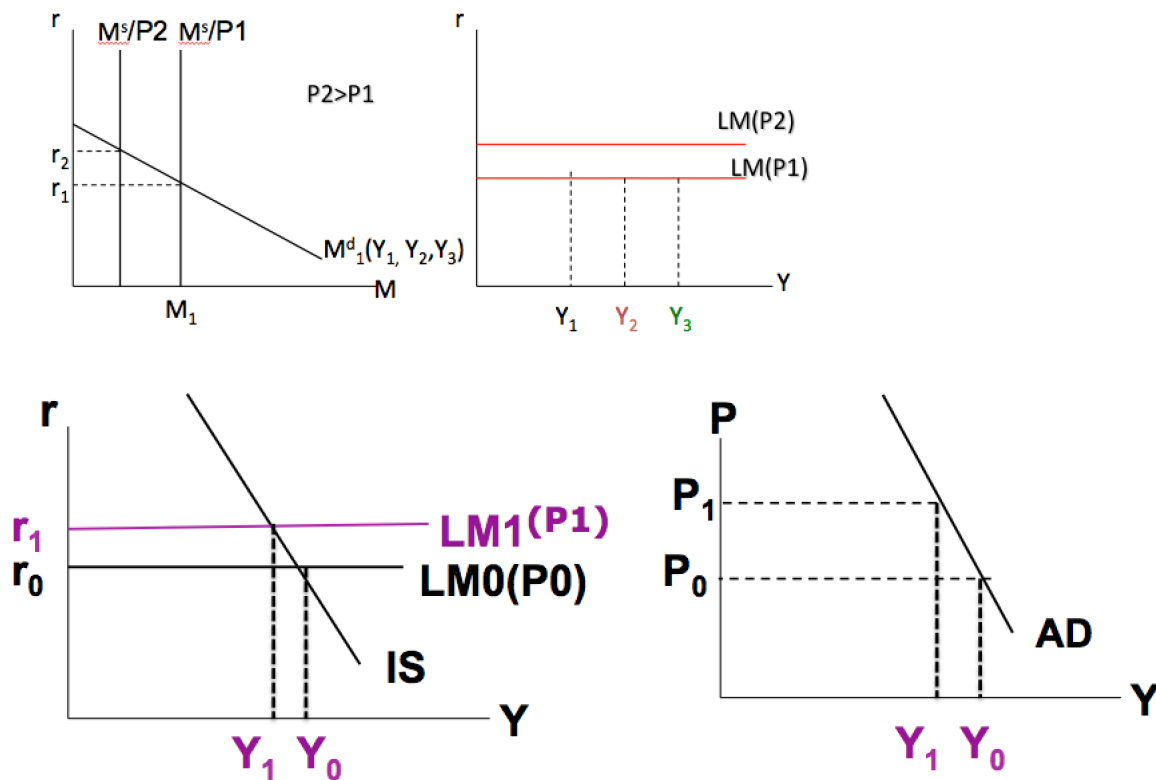


The AD curve also becomes vertical, i.e.  $dY = 0$ . An increase in  $P$  shifts  $dP$  the LM curve up (to the left). However, given a vertical IS curve, the shift of the LM curve has no effect on output. In other words, the increase in the price level increases the interest rate. But the increase in the interest rate does not affect investment and so does not affect demand.

- MPC is zero. IS is very steep.



- Demand for money does not depend on income

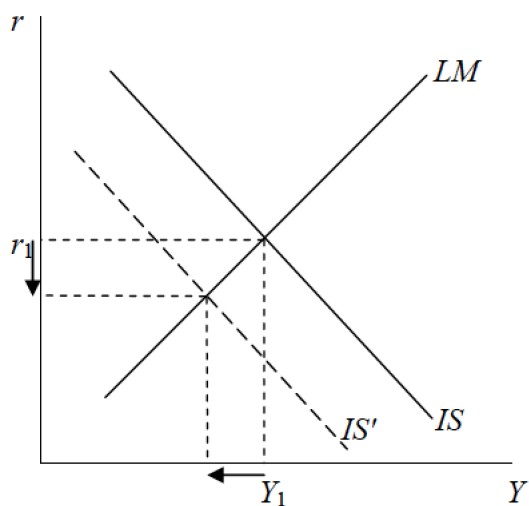


4. In each case below, show how one or both of the IS-LM curves change for the following exogenous changes in the model. Then, from that, determine how output ( $Y$ ), consumption ( $C$ ), interest rate ( $r$ ), money supply ( $MS$ ), Investment ( $I$ ) would change. Graphically illustrate and give reasons for your results.

- A reduction in government purchases
- An increase in the money supply
- A downward shift in the consumption function (less consumed at each  $Y-T$ ).

#### Solution

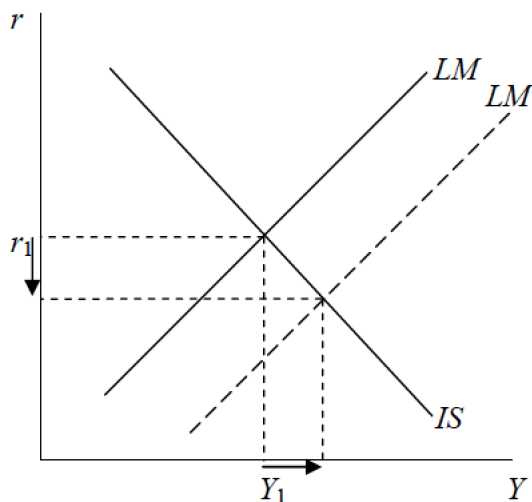
- A reduction in government purchases



- reduction in government purchases, DAE shifts down for all levels of interest rate, output decreases for all levels of interest rate, IS curve shifts to the left.
- A decrease in  $G$  decreases  $Y$  through the multiplier effect. A decrease in  $Y$  in the goods market decreases money demand in the money market. Now, for a given money supply, there is an excess of money supply in the money market. According to the theory of liquidity preference, the interest rate in the money market should decrease because of the adjustment in people's portfolio toward bond holding. Given that the interest rate has decreased, investment increases.
- output ( $Y$ ) decreases
- real interest rate ( $r$ ) decreases
- Money supply is constant
- Consumption decreases (because  $Y$  decreases)
- Investment increases (because  $r$  decreases).

(a) An increase in the money supply

- output ( $Y$ ) increases
- real interest rate ( $r$ ) decreases
- Money supply is constant
- Consumption increases (because  $Y$  increases)
- Investment increases (because  $r$  decreases).



(b) A downward shift in the consumption function (less consumed at each  $Y-T$ ).

- output ( $Y$ ) decreases
- real interest rate ( $r$ ) decreases
- Money supply is constant
- Consumption decreases (because  $Y$  decreases)
- Investment increases (because  $r$  decreases).

